99. (New)The mobile communication system as claimed in claim 98, the processor segments the input data block for composing the sub frames has less than 20480 bits.

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REMARKS

Claims 1-47 are cancelled without prejudice. New Claims 48-99 are added. Claims 48-99 are now pending in the application, with Claims 48, 60, 63, 72, 79, 81, 86, 87, 91, 92, 95 and 97 in independent form, and Claims 49-59, 61, 62, 64-71, 73-78, 80, 82-85, 88-90, 93, 94, 96, 98 and 99 in dependent form.

Figs 1 and 2 have been amended in red to add the label "Prior Art" to each of the figures, and are annexed hereto. Withdrawal of the objections of Figs. 1 and 2 is respectfully requested..

Form 1449, and a copy of the Information Disclosure Statement, is attached hereto as requested by the Examiner.

The Examiner cites Meidan et al. (U.S. Patent 5,936,972), Gelblum et al. (U.S. Patent 6,088,387), Migaku (Japanese Patent Document No. 08-237146), and Shinji (Japanese Patent Document No. 06-350575), in various combinations, to reject now cancelled Claims 1-47. As new Claims 48-99 contain subject matter similar to those of cancelled Claims 1-47, and analysis of the cited references will be provided.

First it needs to be noted that the new claims of the pending application relate to segmenting or assembling an input data frame depending upon at least the Quality of Service (QoS). To improve the efficiency of turbo coding, when data with various data rates is input into the turbo encoder, a super frame or sub frame is constructed to prevent deterioration of the turbo coding in the case of a data frame the exceeds a preset maximum length or a data length that is below a preset minimum length. A preferred embodiment of the apparatus of the present application is depicted in Fig. 3, as opposed to the prior art turbo encoder of Fig. 1.

Second, the cited reference Meidan et al. relates to a method for reducing delay time by determining data rate from data received from a receiver. The apparatus disclosed in Meidan et al. does not segment or assemble data input into a turbo encoder. The Examiner cites Meidan et al., col. 5, line 15 et seq., as alleged evidence of using the QoS to segment or assemble the data input into the turbo encoder. Applicants respectfully disagree. Meidan et al. does not provide a method or an apparatus that constructs data input into a turbo encoder based on the parameters

recited in Meidan et al. What Meidan et al. teaches is a method to reduce the delay time by determining a message structure of a message and decoding the transmitted message. Meidan et al. discloses determining the most likely transmitted message structure. The section of Meidan et al. that the Examiner cites merely states that the Meidan et al. device determines the structure of a received message, and does not teach segmenting or assembling data input into a turbo encoder.

Third, the interleaver of Meidan et al. is a channel interleaver while the interleaver of the present invention is an interleaver internal to the turbo encoder. Further, in the IS-95 system to which Meidan et al. relates, there is no multiplexer for multiplexing outputs of a first and a second constituent encoders, unlike that in a turbo encoder situation.

Fourth, the QoS used in the present invention is distinct from the quality as used in Meidan et al. The QoS of the present invention related to a type of service to be transmitted, transmission speed, and delay times. On the contrary, "quality" as used in Meidan et al. indicates the "syndrome-based channel quality" or the quality of a signal. See Meidan et al., col. 9, lines 39-52.

Fifth, the specific minimum frame size recited in the claims is in no way disclosed by the cited references. The recitation of 320 bits in the claims is distinct to the present invention.

Sixth, and turning now to Gelblum et al., the reference relates to combining a turbo code and a trellis code modulation, and punctures dispensable parity bits in the turbo encoded bits in each sub channel during modulation. In the present invention a multiplexer punctures turbo encoded bits for rate matching. A clearly distinguishable feature.

Seventh, Migaku relates to reducing time delay without considering the size of the turbo encoder data frame as disclosed by the present invention.

Finally, Shinji relates to a method for determining interleaver size for proper channel interleaving to prevent burst error. Data input size is not considered as disclosed by the present invention.

The Applicants request that the Examiner reconsider the foregoing distinctions in reviewing the patentability of the new claims presented herein.

Independent Claims 48, 60, 63, 72, 79, 81, 86, 87, 91, 92, 95 and 97 are believed to be in condition for allowance. Without conceding the patentability per se of dependent Claims 49-59,

61, 62, 64-71, 73-78, 80, 82-85, 88-90, 93, 94, 96, 98 and 99, these are likewise believed to be allowable by virtue of their dependence on their respective amended independent claims.

Accordingly, all of the claims pending in the Application, namely, Claims 48-99, are believed to be in condition for allowance. Should the Examiner believe that a telephone conference or personal interview would facilitate resolution of any remaining matters, the Examiner may contact Applicant's attorney at the number given below.

Respectfully submitted,

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PJF/MJM

<u>Requirements as per C.F.R. § 1.121 (b)(1)(iii)</u>

Replacement page 10, marked up to show all the changes relative to the previous version of the page:

-- case, the turbo encoder according to the present invention segments (or divides) the 10ms frame into 10/4ms subframes and then, turbo encodes four 5120-bit subframe and then recombining four encoded sub frame into 10 ms frame for channel interleaving. The turbo decoder then decodes the four encoded subframes and <u>recomposes</u> [recombines] them into one 20480-bit 10 ms frame.

FIG. 3 is a block diagram of a channel transmitter including a turbo encoder according to an exemplary embodiment of the present invention.

As shown in FIG. 3, user data (UD) is received by a source data encoder 42. The user data UD has a data rate of over several tens of Kbps, such as character, image and moving picture data, as distinguished from voice data having a much lower data rate on the order of several Kbps. The source data encoder 42 encodes the received user data UD by the fixed length frame whose length is determined in accordance with the service type and then provides the encoded fixed length frame data to an input of a bit counter 50. For example, the source data encoder 42 typically encodes voice data with a 10ms frame format, character data with a 20ms frame format, image data with an 80ms frame format, and moving picture data with a 40ms frame format, and provides the respective encoded data into the bit counter 50. The processing size can be different with respect to data rate or frame length. The frame length unit can be fixed 10 ms or fixed 20 ms. A central processing unit (CPU) 46 transfers information about the QoS, i.e., service type of the user data to be transmitted (e.g., voice, character, image or moving picture) and the data rate to a message information receiver 108 of FIG. 6 via a message information transmitter 44. The channel transmission device of FIG. 3 can be equally applied to both the base station and the mobile station.--

Requirements as per C.F.R. § 1.121 (b)(1)(iii)

Replacement for second full paragraph on page 13, marked up to show all the changes relative to the previous version of the paragraph:

--However, in the service having a data rate of 2048Kbps/10ms, if the channel encoder divides (i.e., segments) a frame input to the turbo encoder into four sub frames (i.e., 10ms/4) and encodes the sub frames, and a turbo decoder in the channel decoder then decodes the sub frames and <u>recomposes</u> [recombines] the decoded sub frames into the original frame, the turbo decoder requires a memory capacity which is proportional to 5120 bits by the number of soft decision bits, thereby causing a reduction in the required memory capacity.--

Requirements as per C.F.R. § 1.121 (b)(1)(iii)

Replacement paragraph for the first full paragraph on page 21, marked up to show all the changes relative to the previous version of the paragraph:

--The CPU 112 analyzes the message information provided from the message information receiver 108 and reads frame segment/assemble information from a frame segment/assemble information storage 110 according to the analysis. Also, the CPU 112 analyzes the interleaving information included in the message information and provides an interleaving mode signal and a parameter value to an interleaver and a deinterleaver in a turbo decoder 116 according to the analysis, thereby performing turbo interleaving. In addition, when the receiving data is sub frame (actually the received data is a original frame size but the frame is encoded by sub frame unit), the CPU 112 outputs an N-bit frame segment control signal before turbo decoding and a frame <u>recompose</u> [recombine] control signal after turbo decoding according to the read message information. Here, the information stored in the frame segment/assemble information storage 110 is similar to that stored in the frame segment/assemble information storage 48 of FIG. 3.--

Requirements as per C.F.R. § 1.121 (b)(1)(iii)

Replacement paragraphs for the second and third paragraphs on page 22 and continuing onto the top of page 23, marked up to show all the changes relative to the previous version of the paragraphs:

--Accordingly, under the control of the CPU 112, the N-FB1 122 and the N-FB2 124 in the frame buffer 114 alternately receive and store the data output by the N-bit unit from the bit counter 106, and the stored data is decoded by the turbo decoder 116. When user data decoded by sub frame unit, the decoded data output from the turbo decoder 116 is recomposed [recomposed] into the frames of the original length by a frame recomposer [recombiner] 118 which is controlled by the CPU 112, and then output as the user data through a source data decoder 120.

In summary, the turbo decoder 116, broadly described, receives a super frame consisting of multiple frames or multiple sub frames segmented from a frame, and turbo decodes the received frames. The frame recomposer [recombiner] 118, under the control of the CPU 112, recomposes [recombines], when user data decoded by sub frame unit the output of the turbo decoder 116 into the original frames in response to information about the frame size and number of the frames constituting the sub frames or information about the number of the sub frames segmented from the input frame and the size of the sub frames. The frame recomposer 118, under control of the CPU 112 segments when user data decoded by super frame unit, the output of the turbo decoder 116 into the original frames in response to information about the frame size and number of the frames constituting super frame.--

Requirements as per C.F.R. § 1.121 (b)(1)(iii)

Replacement section entitled "Abstract of the Disclosure", marked up to show all the changes relative to the previous version of the section:

--ABSTRACT OF THE DISCLOSURE

A turbo channel encoding/decoding device for a CDMA communication system. The device segments an input frame into multiple sub frames of an appropriate length when the input data frame is very long, and then encodes and decodes the sub frames. Otherwise, when the input data frames are very short, the device composes [combines] input frames into one super frame of an appropriate length and then encodes and decodes the super frame. After frame encoding/decoding, the frames are recomposed [recombined] into the original input frames.--